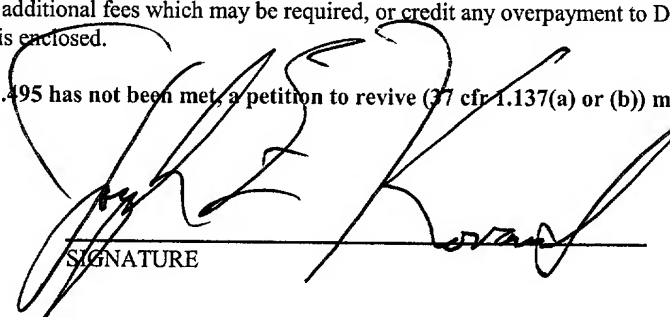


FORM PTO-1390 (REV 10-95)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEYS DOCKET NO.	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371				2613RI-1	
				U.S. APPLICATION NO. (If known, see 35 CFR 1.5) 10/049701	
INTERNATIONAL APPLICATION NO. PCT/GB00/03055		INTERNATIONAL FILING DATE 08 August 2000		PRIORITY DATE CLAIMED 14 August 1999	
TITLE OF INVENTION "SPILL-PROOF CUP"					
APPLICANT(S) FOR DO/EO/US SAMSON, Ilan					
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:					
1.	<input checked="" type="checkbox"/>	This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.			
2.	<input type="checkbox"/>	This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.			
3.	<input checked="" type="checkbox"/>	This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(I).			
4.	<input checked="" type="checkbox"/>	A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.			
5.	<input checked="" type="checkbox"/>	A copy of the International Application as filed (35 U.S.C. 371(c)(2))			
	a.	<input checked="" type="checkbox"/>	is transmitted herewith (required only if not transmitted by the International Bureau).		
	b.	<input type="checkbox"/>	has been transmitted by the International Bureau		
	c.	<input type="checkbox"/>	is not required, as the application was filed in the United States Receiving Office (RO/US).		
6.	<input type="checkbox"/>	A translation of the International Application into English (35 U.S.C. 371(c)(2)).			
7.	<input checked="" type="checkbox"/>	Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).			
	a.	<input type="checkbox"/>	are transmitted herewith (required only if not transmitted by the International Bureau).		
	b.	<input type="checkbox"/>	have been transmitted by the International Bureau.		
	c.	<input type="checkbox"/>	have not been made; however, the time limit for making such amendments has NOT expired.		
	d.	<input checked="" type="checkbox"/>	have not been made and will not be made.		
8.	<input type="checkbox"/>	A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).			
9.	<input type="checkbox"/>	An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).			
10.	<input type="checkbox"/>	A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).			
Items 11. To 16. below concern documents or information included:					
11.	<input type="checkbox"/>	An Information Disclosure Statement under 37n CFR 1.97 and 1.98.			
12.	<input type="checkbox"/>	An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.23 and 3.31 is included.			
13.	<input checked="" type="checkbox"/>	A FIRST preliminary amendment.			
	<input type="checkbox"/>	A SECOND or SUBSEQUENT preliminary amendment.			
14.	<input type="checkbox"/>	A substitute specification.			
15.	<input type="checkbox"/>	A change of power of attorney and/or address letter.			
16.	<input type="checkbox"/>	Other items or information:			
<p>"EXPRESS MAIL" MAILING LABEL NUMBER: EL767781855US DATE OF DEPOSIT: February 14, 2002</p> <p>I HEREBY CERTIFY THAT THIS PAPER OR FEE IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE "EXPRESS MAIL POST OFFICE TO ADDRESSEE" SERVICE UNDER 37 CFR 1.10 ON THE DATE INDICATED ABOVE AND IS ADDRESSED TO THE ASSISTANT COMMISSIONER FOR PATENTS, BOX PCT, WASHINGTON, D.C. 20231.</p> <p>TYPED OR PRINTED NAME: <u>JANICE MESSER</u></p> <p>SIGNATURE: <u><i>Janice Messer</i></u></p>					

U.S. APPLICATION NO. (If known, see 37 CFR 1.51) 10/049701		INTERNATIONAL APPLICATION NO. PCT/GB00/03055		ATTORNEY DOCKET NUMBER 2613RI-1	
17. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)): Search Report has been prepared by the EPO or JPO \$860.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) \$690.00 No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) \$710.00 Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid USPTO \$1,000.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) \$100.00 <div style="text-align: right;">ENTER APPROPRIATE BASIC FEE AMOUNT =</div>				CALCULATIONS PTO USE ONLY	
				\$ 860.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than [] 20 [] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total Claims	12 - 20 =	0	x \$18.00	\$ 0.00	
Independent Claims	1 - 3 =	0	x \$80.00	\$ 0.00	
MULTIPLE DEPENDENT CLAIMS(S) (if applicable)			+ \$270.00	\$	
TOTAL OF ABOVE CALCULATIONS =				\$ 860.00	
<input type="checkbox"/> Applicant claims small entity status under 37 CFR 1.27.				\$	
SUBTOTAL =				\$ 860.00	
Processing fee of \$130.00 for furnishing the English translation later than [] 20 [] 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	
TOTAL NATIONAL FEE =				\$	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) \$40.00 per property				\$	
TOTAL FEES ENCLOSED =				\$ 860.00	
				Amount to be: refunded	\$
				charged	\$
a. <input checked="" type="checkbox"/> A check in the amount of \$ 860.00 to cover the above fees is enclosed. b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 19-1970. A duplicate copy of this sheet is enclosed.					
NOTE: Where an appropriate time limit under 37 cfr 1.494 or 1.495 has not been met, a petition to revive (37 cfr 1.137(a) or (b)) must be filed and granted to restore the application pending status.					
SEND ALL CORRESPONDENCE TO: SHERIDAN ROSS P.C. 1560 Broadway, Suite 1200 Denver, Colorado 80202-5141 Telephone: (303) 863-9700 Facsimile: (303) 863-0223					
 SIGNATURE				Joseph E. Kovarik Registration No. 33,005	

PATENT APPLICATIONS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:

SAMSON, Ilan

Int'l. Serial No.: PCT/GB00/03055

Int'l. Filing Date: 08 August 2000

Priority Date: 14 August 1999

For: "SPILL-PROOF CUP"

Atty. File No.: 2613RI-1

Box PCT

Assistant Commissioner for Patents
Washington, D.C. 20231PRELIMINARY AMENDMENT"EXPRESS MAIL" MAILING LABEL NUMBER: EL767781855US
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PATENTS, BOX PCT, WASHINGTON, D.C. 20231.TYPED OR PRINTED NAME: JANICE MESSERSIGNATURE: Janice Messer

Dear Sir:

Prior to the initial review of the above-identified patent application by the Examiner, please enter the following Preliminary Amendment. Fees for this Preliminary Amendment are calculated and included with the Transmittal Letter accompanying this Amendment. Please charge any underpayment or debit any overpayment to Deposit Account 19-1970.

Please amend the above-identified patent application as follows:

IN THE CLAIMS:

Please amend Claims 1-12 as follows:

1. (Once Amended) A cup comprising a sealingly engageable lid having a drinking spout located thereon, a tubular passage having a first end and a second end, said passage formed between an inner surface of the lid and/or an inside of said spout, and a detachable member located on the lid, said first end of said passage being in communication with an inside of the cup and said second end being in communication with an outside of the spout, and said passage being of such a diameter that air cannot readily bubble past liquid inside said passage.

2. (Once Amended) A cup as claimed in claim 1 wherein the passage has a capacity great enough to contain liquid without any of said liquid reaching an exit of said cup and therefore spilling.

3. (Once Amended) A cup as claimed in claim 1, wherein the passage has a volume that is greater than the maximum value of $H \times V$.

4. (Once Amended) A cup as claimed in claim 1, wherein the detachable member is in the form of a plug which fits into the inside of the spout and is sealingly engaged thereto.

5. (Once Amended) A cup as claimed in claim 4, wherein the plug has an elongate channel on its surface which, in cooperation with the inside of the spout, forms the passage.

6. (Once Amended) A cup as claimed in claim 5, wherein the channel is formed on the inside of the spout or on both the spout and the plug.

7. (Once Amended) A cup as claimed in claim 4, wherein the plug is easily removable and replaceable by a user to enable the passage to be exposed for mechanical cleaning.

8. (Once Amended) A cup as claimed in claim 4, wherein the plug is made from a resiliently compressible material, such as an elastomer.

9. (Once Amended) A cup as claimed in claim 1, wherein the lid has a spout located eccentrically so as to be convenient for drinking from.

10. (Once Amended) A cup as claimed in claim 9 wherein the spout is in the shape of a truncated cone, with a small bore at the top, and a detachable member, in the form of a plug, that has a helical channel around its exterior surface and has an outline matching an inside of a cavity of the spout.

11. (Once Amended) A cup as claimed in claim 1, wherein the diameter of the passage is such that air is prevented from entering past the liquid and wherein said diameter has a maximum diameter of approximately 3mm.

Application No.: PCT/GB00/03055

12. (Once Amended) A cup as claimed in claim 1, having a capacity of 200cc and wherein the capacity of the passage is about 1.2 cc.

Application No.: PCT/GB00/03055

REMARKS/ARGUMENTS

The above amendments are being submitted in connection with the national stage filing of the present Application. The amendments eliminate the multiple dependent claims from the Application.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned **"Version With Markings to Show Changes Made."**

To expedite prosecution, Applicant's counsel requests a telephone interview to discuss any issues that may arise, even prior to a first Office Action. Counsel can be reached directly at (303) 863-2977.

Respectfully submitted,

SHERIDAN ROSS P.C.

By: 

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Registration No. 33,005
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Denver, Colorado 80202-5141
(303) 863-9700

Date: 2/14/02

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claims 1-12 have been amended as follows:

1. (Once Amended) A cup comprising a sealingly engageable lid having a drinking spout located thereon, a tubular passage having a first end and a second end, said passage formed between an inner surface of the lid and/or an inside of said spout, and a detachable member located on the lid, said first end of said passage being [the passage having one end] in communication with an[the] inside of the cup and said second end being[the other end] in communication with an[the] outside of the spout, and said passage being of such a diameter [such] that air cannot readily bubble past liquid inside said passage[it].

2. (Once Amended) A cup as claimed in claim 1 wherein [the capacity of] the passage [is] has a capacity great enough to contain liquid without any of said liquid [it] reaching an[the] exit of said cup and therefore spilling.

3. (Once Amended) A cup as claimed in claim 1, [either of claims 1 or 2] wherein [the volume of] the passage has a volume that is greater than the maximum value of $H \times V$ [as hereinbefore defined].

4. (Once Amended) A cup as claimed in claim 1, wherein [any of claims 1 to 3 in which] the detachable member is in the form of a plug which fits into the inside of the spout and is sealingly engaged thereto[, e.g., by an interference fit].

5. A cup as claimed in claim 4, wherein [in which] the plug has an elongate channel on its surface which, in cooperation with the inside of the spout, forms the passage.

6. A cup as claimed in claim 5, wherein [4 in which] the channel is formed on the inside of the spout or on both the spout and the plug.

7. (Once Amended) A cup as claimed in claim 4, wherein[any of claims 1 to 6 in which] the plug is easily removable and replaceable by a user[, enabling the inside of] to enable the passage to be exposed for mechanical cleaning.

8. (Once Amended) A cup as claimed in claim 4, wherein [any of claims 1 to 7 in which] the plug is made from a resiliently compressible material, such as an elastomer.

9. (Once Amended) A cup as claimed in claim 1,[any of claims 1 to 8] wherein the lid has a spout located eccentrically so as to be convenient for drinking from.

10. (Once Amended) A cup as claimed in claim 9 wherein the spout is in the shape of a truncated cone, with a small bore at the top, and a detachable member, in the form of a plug, that has a helical channel around its exterior surface and [it also] has an outline matching [the] an inside of a cavity of the spout[’s cavity].

11. (Once Amended) A cup as claimed in claim 1,[any of claims 1 to 10] wherein the diameter of the passage is such that air is prevented from entering past the liquid[, for example] and wherein said diameter has a maximum diameter of approximately 3mm.

12. (Once Amended) A cup as claimed in claim 1,[any of claims 1 to 11] having a capacity of 200cc and wherein the capacity of the passage is about 1.2 cc.

WO 01/12031

3/Pt₂

-1-

10/049701
JC11 Rec'd PCT/PTO 14 FEB 2002
PCT/GB00/03055SPILL-PROOF CUP

This invention relates to spill-proof cups and in particular relates to such cups for use by babies or children and the infirm.

The need for spill-proof cups is well known; these are cups with an air-tight lid and a spout which are designed not to leak when the cup is held in a tilted or overturned position by a child, or when the cup falls on its side or even turns over. There are various designs serving this purpose, and these can be broadly divided into four groups:

- a) those requiring some deliberate action to close. These suffer from the obvious disadvantage that the baby/child cannot be relied on to operate the closure.
- b) Self-sealing, containing a valve. These suffer from the general problem in that the use of the valve is 'wrong' in the sense that the direction in which, in one situation, the flow is supposed to be blocked is the same direction in which, in another situation, the flow is desired. Therefore these valves are either not efficient in blocking the leaks, or they offer an undesirable level of resistance to suction. Many also contain areas which are difficult to clean, and others also contain many components which make the cup expensive.
- c) Where an obstruction that covers the exit is pulled away by the suction applied by the drinker. However, this is prone to the venturi effect which tends to partially re-obstruct the exit and possibly induce oscillatory instability.
- d) Flow restraint, without a valve, with which the present invention is concerned.

US 4,795,052 and US 4,915,250 describe two similar versions of such a cup. It contains an airtight lid with a spout. The inside aperture of the spout communicates with the interior of the cup by way of a tubular 'chamber' which is disposed in the lid, starts and ends near the spout, and runs (generally along the rim of the lid) from the first half of the lid to the second half of the lid and back again, so that, as specified in US 4,915,250, when the cup is tilted liquid exiting the cup through said tubular chamber would have to rise above the level of the liquid in the container. This can only happen when the liquid is being sucked out, and thus leakage is prevented even when the cup lies on its side. US 4,795,052 specifies another

WO 01/12031

PCT/GB00/03055

-2-

similar passage between the inside and outside to act as a vent. This eases the suction somewhat but has other disadvantages.

The disadvantage of this arrangement in any practically utilizable form (for example in the product known as the ANSA cup, which uses a tube that is attached to the inside of the spout and runs round along the inside of the rim) is that the inside of this tube cannot be cleaned in a way that is considered necessary for baby feeding equipment: that is, for all surfaces to be accessible to mechanical cleaning action, e.g. by means of a brush or even the finger, especially when milk etc. has solidified inside.

The above mentioned US patents describe a lid with the chamber as a fabrication of two plates, one upper and one lower. This however would either be permanently sealed with the inside of the chamber inaccessible for cleaning, or if detachable it would be impractical to disassemble and reassemble regularly by the user such that the chamber, as disclosed there, is totally sealed everywhere other than at its free end. As noted above, in practice, a tube is used and this is inaccessible to cleaning also.

The present invention seeks to provide a cup improved in the above respects, which is easy to use, spill-proof and easy to clean even when used with solidifiable liquids such as milk.

According to the present invention there is provided a cup including: a sealingly engageable lid having a drinking spout located thereon, a tubular passage formed between inner surface of the lid and/or spout and a detachable member located on the lid, the passage having one end in communication with the inside of the cup and the other end in communication with the outside of the spout and being of such a diameter such that air cannot readily bubble past liquid inside it.

When such a cup is inverted, liquid starts to move downwardly into the passage and the locked air above the liquid expands, thus lowering the pressure. This continues until an amount of liquid has entered the passage with the associated pressure reduction in the air above the liquid just balancing the pressure of the liquid head, upon which further movement of liquid ceases. (The fact that air cannot bubble past the liquid in the passage ensures that the air pressure is

WO 01/12031

PCT/GB00/03055

-3-

not restored while the cup is inverted or reclined.) Thus the capacity of the passage should be great enough to contain this amount of liquid without reaching the exit and therefore spilling.

Although there will be variations for cups of non-cylindrical shapes, in principle the volume increase (in cc) to give the reduction in air pressure to support a given head of liquid (e.g. water) is given by: $H \times V$, where V is the volume (in litres) of air inside the cup, and, with the cup inverted, H is the height (in cm) of the water level above the exit of the spout. This varies according to the water level, but usually at a maximum with cup about half full. Thus, in the preferred form of the invention, the volume of the passage is greater than the maximum value of $H \times V$.

The spout is preferably tapered so easily to receive the detachable member, and is preferably conical, most preferably in the form of a truncated cone. The detachable member is preferably in the form of a plug which fits into the inside of the spout and is sealingly engaged thereto, e.g. by an interference fit. The plug will generally therefore have the same or similar outside configuration as the inside of the spout. The plug preferably has an elongate channel on its surface which, in cooperation with the inside of the spout, forms the passage. However, the channel could instead be formed on the inside of the spout or on both the spout and the plug, or indeed between two or more parts which make up the plug. In any event, the plug is easily removable and replaceable by a user, enabling the inside of the passage to be exposed for mechanical cleaning thereof. It is usually more convenient, and therefore cheaper, to manufacture the device with the channel formed in the plug. This is also better for cleaning purposes. The plug is preferably made from a resiliently compressible material, such as an elastomer, and may advantageously be moulded therefrom.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:

Figure 1 illustrates the lid of a drinking cup in side elevation (a), end elevation (b) and bottom plan (c) views;

WO 01/12031

PCT/GB00/03055

-4-

Figure 2 shows the plug of the invention in side (a) and end (b) elevation;

Figure 3 is a diagrammatic side view of a typical cup and lid;

Figure 4 is a similar view to figure 1 (b) of second embodiment of the invention; and

Figure 5 (a) is a similar view to Figure 2(a) of the second embodiment, and (b) is a bottom elevation.

Referring to the drawings, and in particular Figures 1 and 2, a lid 10 has sides 12 which are sealingly engagable with a cup in a manner known *per se*. The lid has a spout 14 located eccentrically so as to be convenient for drinking from. The spout 14 is in the shape of a truncated cone, preferably flattened (i.e. with an oval cross-section), and with a small bore 16 at the top. A detachable member, in the form of a plug 18 moulded from an elastomer, has a helical channel 20 around its exterior surface and it also has an outline matching the inside of the spout's cavity. The ridges 22 between respective channel portions are such as to make sealable contact with the inside surface of the spout's cavity. The top end of the channel 20 is in communication with the bore 16 in the top of the spout, and therefore the outside of the cup, and the bottom of the channel communicates, in use, with the interior of the cup.

Preferably the lower (wider) end of the plug 18 has integrally formed or attached to it a downward pointing extension, for instance in the form of a tab or a ring 24, with which the plug can be pulled out of the spout cavity for cleaning. This also adds to the size of the plug as a whole to conform with regulations governing the minimum size of objects which a baby might introduce into its mouth. When the plug is inserted into the spout's cavity, a tubular passage is formed by the channel 20 which is sealed everywhere except at its two ends. The diameter of the passage is such that air is prevented from entering past the liquid, for example a maximum diameter of approximately 3mm. When the cup is inverted, liquid starts to enter the tubular passage, thus causing the air inside the cup to expand and thus reduce in pressure. When the sub-pressure thus created inside the cup equals the pressure of the water-head between the upper level of the liquid and the lowest point that it reaches in the tubular passage, the ingress of liquid into the passage ceases. The volume of the canal is such that at this point

WO 01/12031

PCT/GB00/03055

-5-

the liquid has not yet reached the outlet of the bore 16. Preferably, the volume of the passage should be somewhat larger so as to absorb the effect of downward shaking of the cup. For example, for a 200cc cup of typical shape, the volume of the passage would be approx. 1.2c.c. When the cup is returned to the upright position the sub-pressure retracts the liquid in the passage ready for the next inversion.

Referring now to Figure 3, a 250 c.c. cup 24 is shown of typical shape, having the lid 10 and spout 14, the latter containing the plug of the invention. It is illustrated inverted, with a water level of height H cm above the spout bore 16, and an air space of volume V.

The height H and volume V for various fill levels for the above cup are given in the table below:

H (cm) of water	V (litres) of air	Min. passage vol. HxV (cc)
4.0	0.226	0.905
5.0	0.195	0.975
5.5	0.180	0.991
6.0	0.165	0.993
6.5	0.151	0.983
7.0	0.137	0.962
8.0	0.111	0.886

As can be seen from the above table, the greatest volume at approximately half full is 0.993 cc. Accordingly, in order to allow some leeway as described above, a passage capacity of 1.2 cc might be employed. If the passage is of the maximum 3mm diameter, its cross sectional area would be approx 0.07cm^2 , so for a volume of 1.2 cc its length would need to be about 17 cm. This is easily achieved with a helically formed channel 20 on the plug 18. The configuration of the passage does not need to be helical but can be any shape that is convenient

WO 01/12031

PCT/GB00/03055

-6-

and yet allows the relevant length to be achieved. A helical channel is a very compact and convenient way of doing this.

Referring now to Figures 4 and 5, and using like numerals for like parts, the spout 14 in this case is a tilted truncated cone. In a particular example, the wall thickness of the cone is 1.5mm, with an outside diameter at the top of 13mm. The plug 18 is in the form of a hollow truncated cone also, with a helical channel 20 about its exterior as before. The bottom of the plug 18 terminates in a hollow cylindrical portion 26 which provides a grip for removing the plug from the spout 18. The cylindrical grip 26 may have segments 28 cut out to further lighten it and avoid liquid being trapped inside when the cup is inverted. Other forms of grip could be used.

In this example, the height of the plug is 27mm, its outside diameter at the top is 10mm and its OD at the bottom 21mm. The width of the channel is approx. 3.2mm, the width of the ridges between the channels is approx. 1.2mm and the number of turns is approx. 5, to give the necessary channel length. The cone half angle is approx. 11.7° .

WO 01/12031

PCT/GB00/03055

-7-

CLAIMS

1. A cup comprising a sealingly engageable lid having a drinking spout located thereon, a tubular passage formed between inner surface of the lid and/or spout and a detachable member located on the lid, the passage having one end in communication with the inside of the cup and the other end in communication with the outside of the spout and being of such a diameter such that air cannot readily bubble past liquid inside it.
2. A cup as claimed in claim 1 wherein the capacity of the passage is great enough to contain liquid without any of it reaching the exit and therefore spilling.
3. A cup as claimed in either of claims 1 or 2 wherein the volume of the passage is greater than the maximum value of $H \times V$ as hereinbefore defined.
4. A cup as claimed in any of claims 1 to 3 in which the detachable member is in the form of a plug which fits into the inside of the spout and is sealingly engaged thereto, e.g. by an interference fit.
5. A cup as claimed in claim 4 in which the plug has an elongate channel on its surface which, in cooperation with the inside of the spout forms the passage.
6. A cup as claimed in claim 4 in which the channel is formed on the inside of the spout or on both the spout and the plug.
7. A cup as claimed in any of claims 1 to 6 in which the plug is easily removable and replaceable by a user, enabling the inside of the passage to be exposed for mechanical cleaning thereof.
8. A cup as claimed in any of claims 1 to 7 in which the plug is made from a resiliently compressible material, such as an elastomer.

WO 01/12031

PCT/GB00/03055

-8-

9. A cup as claimed in any of claims 1 to 8 wherein the lid has a spout located eccentrically so as to be convenient for drinking from.

10. A cup as claimed in claim 9 wherein the spout is in the shape of a truncated cone, with a small bore at the top, and a detachable member, in the form of a plug, has a helical channel around its exterior surface and it also has an outline matching the inside of the spout's cavity.

11. A cup as claimed in any of claims 1 to 10 wherein the diameter of the passage is such that air is prevented from entering past the liquid, for example a maximum diameter of approximately 3mm.

12. A cup as claimed in any of claims 1 to 11 having a capacity of 200cc wherein the capacity of the passage is about 1.2 cc.

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(21) International Application Number: PCT/GB00/03055

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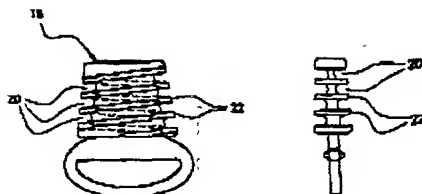
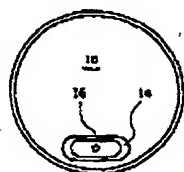
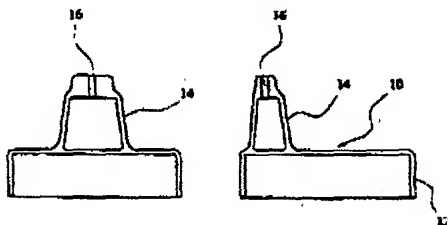
(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(71) Applicant (for all designated States except US): ROYAL INDUSTRIES (THAILAND) PLC (TH/TH); 126 Moo Sethakiji I Road, Omnoi, Krathumban, Samuthsakorn 74130 (TH).

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,

[Continued on next page]

(54) Title: SPILL-PROOF CUP



(57) Abstract: A cup is disclosed which includes: a sealingly engageable lid (10) having a drinking spout (14) located thereon, a tubular passage (20) formed between inner surface of the lid (10) and/or spout (14) and a detachable member (18) located on the lid (10), the passage (20) having one end in communication with the inside of the cup and the other end in communication with the outside of the spout (14) and being of such a diameter such that air cannot readily bubble past liquid inside it. When such a cup is inverted, the head of liquid inside lowers the pressure of the air above the liquid, and liquid therefore starts to move downwardly through the passage. This continues until the reduction in air pressure above the liquid just balances the pressure of the liquid head, when further movement of liquid ceases. (The fact that air cannot bubble past the liquid in the passage ensures that the air pressure is not restored while the cup is inverted or reclined). Thus the capacity of the passage should be great enough to contain this amount of liquid without reaching the exit and therefore spilling.

WO 01/12031 A1

WO 01/12031

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-1/3-

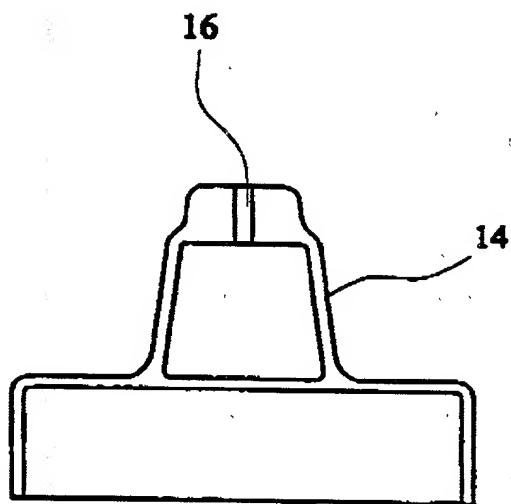


FIG. 1(a)

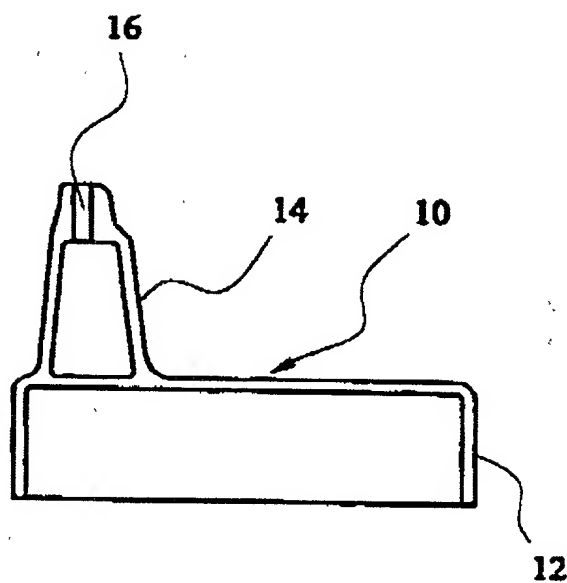


FIG. 1(b)

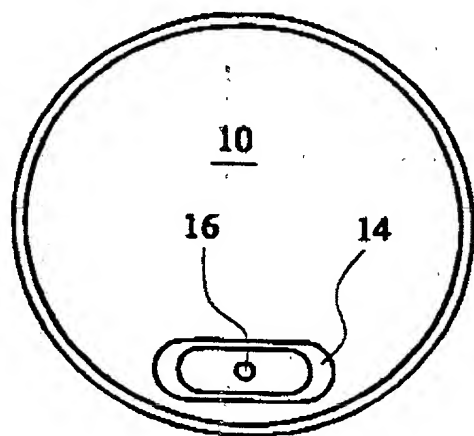


FIG. 1(c)

WO 01/12031

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-2/3-

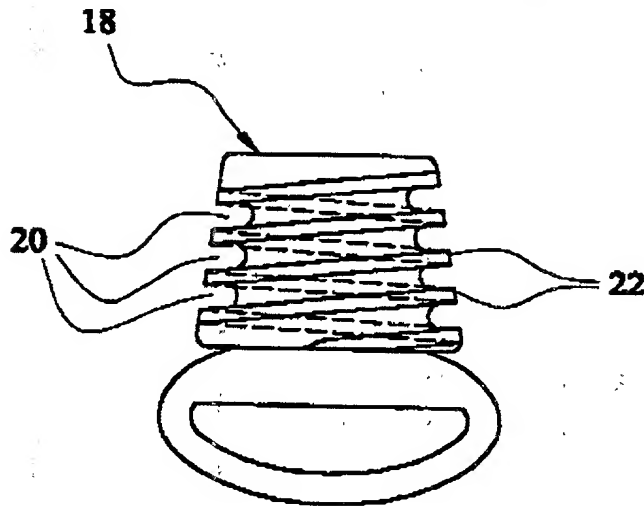


FIG. 2(a)

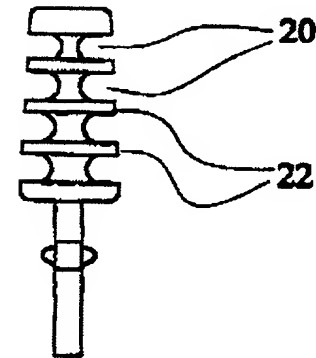


FIG. 2(b)

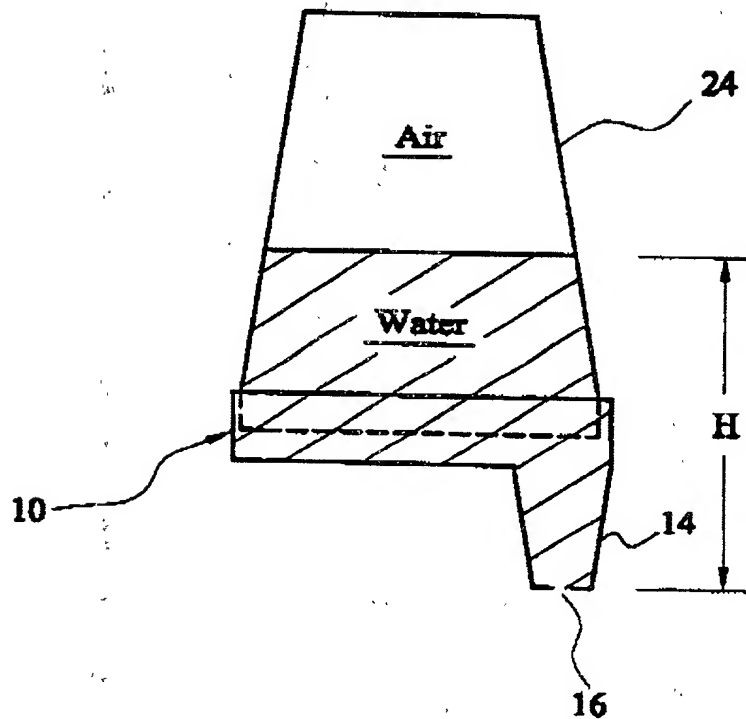


FIG. 3

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WO 01/12031

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-3/3-

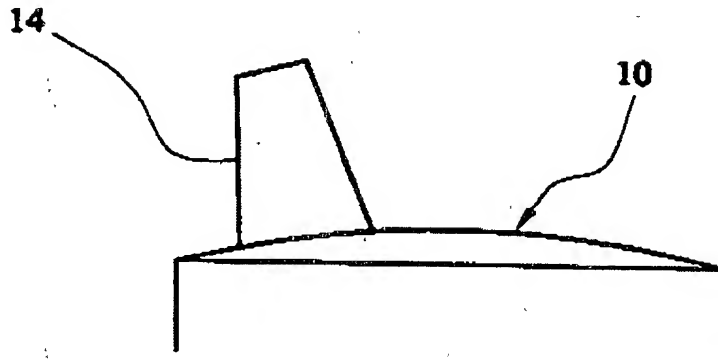


FIG. 4

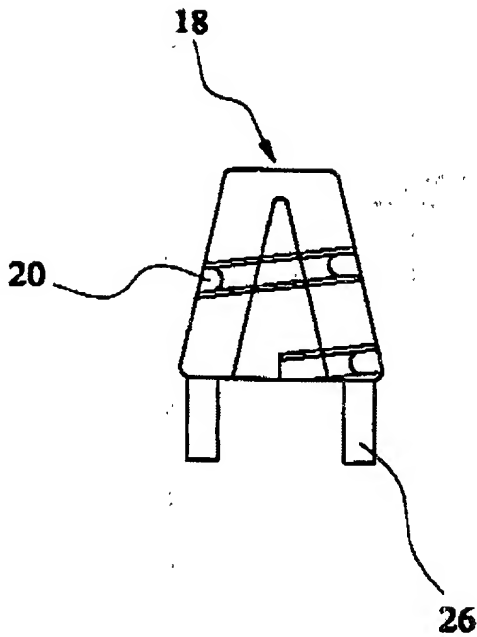


FIG. 5(a)

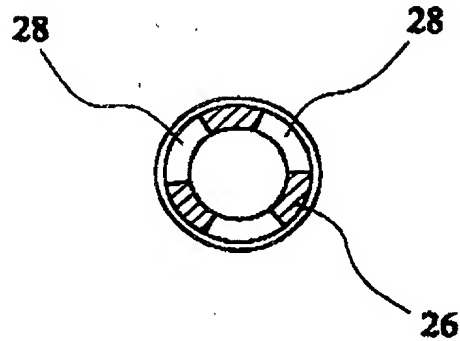


FIG. 5(b)

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DO/PTO Rev. 6/95 DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION <input type="checkbox"/> Declaration Submitted with Initial Filing OR <input checked="" type="checkbox"/> Declaration Submitted after Initial Filing	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket Number	2613RI-1
		First Named Inventor	SAMSON, Ilan
	COMPLETE IF KNOWN		
	Application Number	10/049,701	
	Filing Date		
	Group Art Unit		
		Examiner Name	

As below named inventor, I hereby declare that::

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed for which a patent is sought on the invention entitled:

"SPILL-PROOF CUP"

(Title of the Invention)

the specification of which

☐ is attached hereto

OR

☒ was filed on
(MM/DD/YYYY)

08 August 2000

as United States Application Number or PCT International

Application Number

PCT/GB00/03055

and was amended on
(MM/DD/YYYY)

(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred above.

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I hereby claim foreign priority benefits under Title 35, United States Code § 119 (a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any Pct international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				Yes	No
GB9919133.0	United Kingdom	August 14, 1999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Application Number(s)	Filing Date (MM/DD/YYYY)		
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DECLARATION

Page 2

I hereby claim the benefit under Title 35, United States Code § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States of PCT international application in the manner provided by the first paragraph of Title 35, United States Code § 112.1 acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application Number	PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)

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As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

☒ Firm Name OR **SHERIDAN ROSS P.C.** Customer Number or label **22442**

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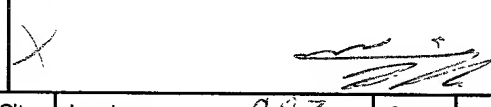
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Country: UNITED STATES OF AMERICA Telephone: (303) 863-9700 Fax: (303) 863-0223

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Name of Sole or First Inventor: ☐ A petition has been filed for this unsigned inventor

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Inventor's Signature:  Date: 29/3/2002

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DECLARATION

ADDITIONAL and/or AGENT INFORMATION
Supplemental Sheet

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